

CLAIMS**WHAT IS CLAIMED:**

1. An implantable medical device, comprising:
a device housing, said device housing having a plurality of interior surfaces;
a component case positioned within said device housing, said component case having a plurality of interior surfaces; and
an insulating material formed on at least one of said plurality of interior surfaces of at least one of said device housing and said component case.
2. The implantable medical device of claim 1, further comprising at least one of a capacitor, a battery, a fuel cell and an electronics module positioned within at least one of said device housing and said component case.
3. The implantable medical device of claim 1, wherein said device housing is comprised of at least one of aluminum, titanium and stainless steel.
4. The implantable medical device of claim 1, wherein said component case is comprised of at least one of aluminum, titanium and stainless steel.
5. The implantable medical device of claim 1, wherein said insulating material is formed on all of said interior surfaces of said component case.
6. The implantable medical device of claim 1, wherein said insulating material is formed on all of said interior surfaces of said device housing.
7. The implantable medical device of claim 1, wherein said insulating material is formed on at least one of said plurality of interior surfaces of each of said device housing and said component case.

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8. The implantable medical device of claim 1, wherein said insulating material is formed on all of said interior surfaces of said device housing and said component case.

9. The implantable medical device of claim 1, wherein said insulating material is comprised of a metal oxide.

10. The implantable medical device of claim 1, wherein said insulating material has a thickness ranging from approximately 10 nm – 500 μ m.

11. The implantable medical device of claim 1, wherein at least one of said device housing and said component case is comprised of a metal and said insulating material is comprised of a metal oxide.

12. The implantable medical device of claim 1, wherein at least one of said device housing and said component case is comprised of aluminum and said insulating material is comprised of aluminum oxide.

13. The implantable medical device of claim 1, wherein at least one of said device housing and said component case is comprised of titanium and said insulating material is comprised of titanium oxide.

14. The implantable medical device of claim 1, wherein said insulating material is comprised of a plastic material.

15. The implantable medical device of claim 1, wherein said insulating material is selected from the group consisting of a fluoroplastic, a fluoroelastomer, a polyester, a polyamide, polyethylene, polypropylene, polyacetal, polyetherketones, polyaryketones, polyether sulfones, polyphenyl sulfones, polysulfones, polyarylsulfones, polyetherimides, polyimides, poly(amide-imides), PVC, PVDC-PVC copolymers, CPVC, polyfurans, poly(phenylene sulfiles), epoxy resins, silicone elastomers, nitrile rubbers, chloroprene polymers, chlorosulfonated rubbers, poly-

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sulfide rubbers, ethylene-polypropylene elastomers, butyl rubbers, polyacrylic rubbers, a fiber-reinforced plastic, and glass.

16. The implantable medical device of claim 1, wherein said insulating material is comprised of an epoxy material.

17. The implantable medical device of claim 1, wherein said insulating material is selected from the group consisting of aliphatic epoxy, chemically resistant thermoplastic hot melt materials, polyamide, polyester, polyurethane, epoxy, polyethylene-vinyl acetate, UV curable resin, acrylate, methacrylate, thermosetting resin, aromatic epoxy, silicone, a thermally cured adhesive, and a UV-cured adhesive.

18. The implantable medical device of claim 1, wherein said insulating material is comprised of a ceramic material.

19. The implantable medical device of claim 1, further comprising an insulating liner positioned between a component comprised of at least one of a capacitor, a battery, a fuel cell and an electronics module positioned in said component case and an insulating material formed on at least one interior surface of said component case.

20. The implantable medical device of claim 8, wherein said insulating material is comprised of at least one of a metal oxide, a plastic material, an epoxy material and a ceramic material.

21. The implantable medical device of claim 1, wherein said device housing further comprises a plurality of exterior surfaces and said insulating material is formed on at least one of said exterior surfaces of said device housing.

22. The implantable medical device of claim 1, wherein said component case further comprises a plurality of exterior surfaces and said insulating material is formed on at least one of said exterior surfaces of said component case.

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23. The implantable medical device of claim 21, wherein said component case further comprises a plurality of exterior surfaces and said insulating material is formed on at least one of said exterior surfaces of said component case.

24. The implantable medical device of claim 7, wherein said component case further comprises a plurality of exterior surfaces and said insulating material is formed on at least one of said exterior surfaces of said component case.

25. The implantable medical device of claim 24, wherein said device housing further comprises a plurality of exterior surfaces and said insulating material is formed on at least one of said exterior surfaces of said device housing.

26. An implantable medical device, comprising:
a device housing, said device housing having a plurality of exterior surfaces;
a component case positioned within said device housing, said component case having a plurality of exterior surfaces; and
an insulating material formed on at least one of said plurality of exterior surfaces of at least one of said device housing and said component case.

27. The implantable medical device of claim 26, further comprising at least one of a capacitor, a battery, a fuel cell and an electronics module positioned within at least one of said device housing and said component case.

28. The implantable medical device of claim 26, wherein said device housing is comprised of at least one of aluminum, titanium and stainless steel.

29. The implantable medical device of claim 26, wherein said component case is comprised of at least one of aluminum, titanium and stainless steel.

30. The implantable medical device of claim 26, wherein said insulating material is formed on all of said exterior surfaces of said component case.

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31. The implantable medical device of claim 26, wherein said insulating material is formed on all of said exterior surfaces of said device housing.

32. The implantable medical device of claim 26, wherein said insulating material is formed on at least one of said plurality of exterior surfaces of said device housing and said component case.

33. The implantable medical device of claim 26, wherein said insulating material is formed on all of said exterior surfaces of said device housing and said component case.

34. The implantable medical device of claim 26, wherein said insulating material is comprised of a metal oxide.

35. The implantable medical device of claim 26, wherein said insulating material has a thickness ranging from approximately 10 nm – 500 μ m.

36. The implantable medical device of claim 26, wherein at least one of said device housing and said component case is comprised of a metal and said insulating material is comprised of a metal oxide.

37. The implantable medical device of claim 26, wherein at least one of said device housing and said component case is comprised of aluminum and said insulating material is comprised of aluminum oxide.

38. The implantable medical device of claim 26, wherein at least one of said device housing and said component case is comprised of titanium and said insulating material is comprised of titanium oxide.

39. The implantable medical device of claim 26, wherein said insulating material is comprised of a plastic material.

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40. The implantable medical device of claim 26, wherein said insulating material is selected from the group consisting of a fluoroplastic, a fluoroelastomer, a polyester, a polyamide, polyethylene, polypropylene, polyacetal, polyetherketones, polyarylketones, polyether sulfones, polyphenyl sulfones, polysulfones, polyarylsulfones, polyetherimides, polyimides, poly(amide-imides), PVC, PVDC-PVC copolymers, CPVC, polyfurans, poly(phenylene sulfiles), epoxy resins, silicone elastomers, nitrile rubbers, chloroprene polymers, chlorosulfonated rubbers, polysulfide rubbers, ethylene-polypropylene elastomers, butyl rubbers, polyacrylic rubbers, a fiber-reinforced plastic and glass.

41. The implantable medical device of claim 26, wherein said insulating material is comprised of an epoxy material.

42. The implantable medical device of claim 26, wherein said insulating material is selected from the group consisting of aliphatic epoxy, chemically resistant thermoplastic hot melt materials, polyamide, polyester, polyurethane, epoxy, polyethylene-vinyl acetate, UV curable resin, acrylate, methacrylate, thermosetting resin, aromatic epoxy, silicone, a thermally cured adhesive, and a UV-cured adhesive.

43. The implantable medical device of claim 26, wherein said insulating material is comprised of a ceramic material.

44. The implantable medical device of claim 26, further comprising an insulating liner positioned between a component comprised of at least one of a capacitor, a battery, a fuel cell and an electronics module positioned in said component case and said insulating material formed on said at least one interior surface of said component case.

45. The implantable medical device of claim 33, wherein said insulating material is comprised of at least one of a metal oxide, a plastic material, an epoxy material and a ceramic material.

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46. The implantable medical device of claim 26, wherein said device housing further comprises a plurality of interior surfaces and said insulating material is formed on at least one of said interior surfaces of said device housing.

47. The implantable medical device of claim 26, wherein said component case further comprises a plurality of interior surfaces and said insulating material is formed on at least one of said interior surfaces of said component case.

48. The implantable medical device of claim 46, wherein said component case further comprises a plurality of interior surfaces and said insulating material is formed on at least one of said interior surfaces of said component case.

49. The implantable medical device of claim 32, wherein said component case further comprises a plurality of interior surfaces and said insulating material is formed on at least one of said interior surfaces of said component case.

50. The implantable medical device of claim 49, wherein said device housing further comprises a plurality of exterior surfaces and said insulating material is formed on at least one of said exterior surfaces of said device housing.

51. A method, comprising:

providing at least one of a device housing for an implantable medical device and a component case adapted to have a component comprised of at least one of a capacitor module, a battery, a fuel cell and an electronics module positioned therein, each of said device housing and said component case having a plurality of interior surfaces; and

forming an insulating material on at least one of said interior surfaces of at least one of said device housing and said component case.

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52. The method of claim 51, wherein forming an insulating material comprises forming an insulating material comprised of a metal oxide.

53. The method of claim 51, wherein forming an insulating material comprises forming an insulating material comprised of at least one of an aluminum oxide and a titanium oxide.

54. The method of claim 51, wherein forming an insulating material comprises forming an insulating material having a thickness ranging from approximately 10 nm – 500 μ m.

55. The method of claim 51, wherein forming an insulating material comprises forming an insulating material comprised of a plastic material.

56. The method of claim 51, wherein forming an insulating material comprises forming an insulating material selected from the group consisting of a fluoroplastic, a fluoroelastomer, a polyester, a polyamide, polyethylene, polypropylene, polyacetal, polyetherketones, polyaryketones, polyether sulfones, polyphenyl sulfones, polysulfones, polyarylsulfones, polyetherimides, polyimides, poly(amide-imides), PVC, PVDC-PVC copolymers, CPVC, polyfurans, poly(phenylene sulfiles), epoxy resins, silicone elastomers, nitrile rubbers, chloroprene polymers, chlorosulfonated rubbers, polysulfide rubbers, ethylene-polypropylene elastomers, butyl rubbers, polyacrylic rubbers, a fiber-reinforced plastic and glass.

57. The method of claim 51, wherein forming an insulating material comprises forming an insulating material comprised of an epoxy material.

58. The method of claim 51, wherein forming an insulating material comprises forming an insulating material selected from the group consisting of aliphatic epoxy, chemically resistant thermoplastic hot melt materials, polyamide, polyester, polyurethane, epoxy, polyethylene-vinyl acetate, UV curable resin, acrylate, methacrylate, thermosetting resin, aromatic epoxy, silicone, a thermally cured adhesive, and a UV-cured adhesive.

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59. The method of claim 51, wherein forming an insulating material comprises forming an insulating material comprised of a ceramic material.

60. The method of claim 51, wherein forming an insulating material comprises performing at least one oxidation process to form an insulating material comprised of a metal oxide.

61. The method of claim 51, wherein forming an insulating material on at least one of said interior surfaces of at least one of said device housing and said component case comprises forming an insulating material on at least one of said interior surfaces of said device housing and on at least one of said interior surfaces of said component case.

62. The method of claim 51, further comprising positioning said component in said component case.

63. The method of claim 51, further comprising positioning an insulating liner around said component prior to positioning said component in said component case.

64. The method of claim 51, wherein said device housing and said component case further comprise a plurality of exterior surfaces and wherein said method further comprises forming said insulating material on at least one of said exterior surfaces of at least one of said device housing and component case.

65. The method of claim 61, wherein said device housing and said component case further comprise a plurality of exterior surfaces and wherein said method further comprises forming said insulating material on at least one of said exterior surfaces of at least one of said device housing and component case.

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66. The method of claim 61, wherein said device housing and said component case further comprise a plurality of exterior surfaces and wherein said method further comprises forming said insulating material on at least one of said exterior surfaces of said device housing and on at last one of said exterior surfaces of said component case.

67. A method, comprising:

providing at least one of a device housing for an implantable medical device and a component case adapted to have a component comprised of at least one of a capacitor module, a battery, a fuel cell and an electronics module positioned therein, each of said device housing and said component case having a plurality of exterior surfaces; and
forming an insulating material on at least one of said exterior surfaces of at least one of said device housing and said component case.

68. The method of claim 67, wherein forming an insulating material comprises forming an insulating material comprised of a metal oxide.

69. The method of claim 67, wherein forming an insulating material comprises forming an insulating material comprised of at least one of an aluminum oxide and a titanium oxide.

70. The method of claim 67, wherein forming an insulating material comprises forming an insulating material having a thickness ranging from approximately 10 nm – 500 μ m.

71. The method of claim 67, wherein forming an insulating material comprises forming an insulating material comprised of a plastic material.

72. The method of claim 67, wherein forming an insulating material comprises forming an insulating material selected from the group consisting of a fluoroplastic, a fluoroelastomer, a polyester, a polyamide, polyethylene, polypropylene, polyacetal, polyetherketones, polyarylketones, polyether sulfones, polyphenyl sulfones, polysulfones,

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polyarylsulfones, polyetherimides, polyimides, poly(amide-imides), PVC, PVDC-PVC copolymers, CPVC, polyfurans, poly(phenylene sulfides), epoxy resins, silicone elastomers, nitrile rubbers, chloroprene polymers, chlorosulfonated rubbers, polysulfide rubbers, ethylene-polypropylene elastomers, butyl rubbers, polyacrylic rubbers, a fiber-reinforced plastic and glass.

73. The method of claim 67, wherein forming an insulating material comprises forming an insulating material comprised of an epoxy material.

74. The method of claim 67, wherein forming an insulating material comprises forming an insulating material selected from the group consisting of aliphatic epoxy, chemically resistant thermoplastic hot melt materials, polyamide, polyester, polyurethane, epoxy, polyethylene-vinyl acetate, UV curable resin, acrylate, methacrylate, thermosetting resin, aromatic epoxy, silicone, a thermally cured adhesive, and a UV-cured adhesive.

75. The method of claim 67, wherein forming an insulating material comprises forming an insulating material comprised of a ceramic material.

76. The method of claim 67, wherein forming an insulating material comprises performing at least one oxidation process to form an insulating material comprised of a metal oxide.

77. The method of claim 67, wherein forming an insulating material on at least one of said exterior surfaces of at least one of said device housing and said component case comprises forming an insulating material on at least one of said exterior surfaces of said device housing and on at least one of said exterior surfaces of said component case.

78. The method of claim 67, further comprising positioning said component in said component case.

79. The method of claim 67, further comprising positioning an insulating liner around said component prior to positioning said component in said component case.

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80. The method of claim 67, wherein said device housing and said component case further comprise a plurality of interior surfaces and wherein said method further comprises forming said insulating material on at least one of said interior surfaces of at least one of said device housing and component case.

81. The method of claim 77, wherein said device housing and said component case further comprise a plurality of interior surfaces and wherein said method further comprises forming said insulating material on at least one of said interior surfaces of at least one of said device housing and component case.

82. The method of claim 77, wherein said device housing and said component case further comprise a plurality of interior surfaces and wherein said method further comprises forming said insulating material on at least one of said interior surfaces of said device housing and on at least one of said interior surfaces of said component case.

83. An implantable medical device, comprising:
a device housing, said device housing having a plurality of surfaces; and
an insulating material formed on at least one of said plurality surfaces.

84. The implantable medical device of claim 83, further comprising at least one of a capacitor, a battery, a fuel cell and an electronics module positioned within said device housing.

85. The implantable medical device of claim 83, wherein said device housing is comprised of at least one of aluminum, titanium and stainless steel.

86. The implantable medical device of claim 83, wherein said insulating material is formed on all of said interior surfaces of said device housing.

87. The implantable medical device of claim 83, wherein said insulating material is formed on at least one exterior surface of said device housing.

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88. The implantable medical device of claim 83, wherein said insulating material is comprised of a metal oxide.

89. The implantable medical device of claim 83, wherein said insulating material has a thickness ranging from approximately 10 nm – 500 μm.

90. The implantable medical device of claim 83, wherein said device housing is comprised of a metal and said insulating material is comprised of a metal oxide.

91. The implantable medical device of claim 83, wherein said insulating material is comprised of a plastic material.

92. The implantable medical device of claim 83, wherein said insulating material is selected from the group consisting of a fluoroplastic, a fluoroelastomer, a polyester, a polyamide, polyethylene, polypropylene, polyacetal, polyetherketones, polyarylketones, polyether sulfones, polyphenyl sulfones, polysulfones, polyarylsulfones, polyetherimides, polyimides, poly(amide-imides), PVC, PVDC-PVC copolymers, CPVC, polyfurans, poly(phenylene sulfiles), epoxy resins, silicone elastomers, nitrile rubbers, chloroprene polymers, chlorosulfonated rubbers, polysulfide rubbers, ethylene-polypropylene elastomers, butyl rubbers, polyacrylic rubbers, a fiber-reinforced plastic, and glass.

93. The implantable medical device of claim 83, wherein said insulating material is comprised of an epoxy material.

94. The implantable medical device of claim 83, wherein said insulating material is selected from the group consisting of aliphatic epoxy, chemically resistant thermoplastic hot melt materials, polyamide, polyester, polyurethane, epoxy, polyethylene-vinyl acetate, UV curable resin, acrylate, methacrylate, thermosetting resin, aromatic epoxy, silicone, a thermally cured adhesive, and a UV-cured adhesive.

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95. The implantable medical device of claim 83, wherein said insulating material is comprised of a ceramic material.

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